



PREVALENCE OF HEPATITIS C VIRUS INFECTION AMONG BLOOD DONORS AT A TERTIARY CARE CENTRE: A RETROSPECTIVE STUDY

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Abstract

Background: Hepatitis C virus (HCV) infection is a major transfusion-transmitted infection and a global public health challenge. Despite mandatory screening of blood donors, periodic surveillance remains essential to ensure transfusion safety.

Objectives: To determine the seroprevalence of HCV infection among blood donors at a tertiary care centre and to analyse year-wise trends.

Materials and Methods: A retrospective, record-based study was conducted in the blood bank of a tertiary care teaching hospital. Blood donor records from January 2021 to December 2025 were reviewed. All donated blood units were screened for anti-HCV antibodies using a third-generation enzyme-linked immunosorbent assay (ELISA). Data were analysed to calculate prevalence and trends.

Results: A total of 11,820 blood donations were screened during the study period. Six donors were found to be reactive for anti-HCV antibodies, yielding an overall seroprevalence of 0.05%. No reactive cases were observed in 2021 and 2023, while one reactive donor each was identified in 2022 and 2024, and four reactive donors were detected in 2025.

Conclusion: The study demonstrates a low prevalence of HCV infection among blood donors, reflecting effective donor selection and screening practices. Continuous surveillance is necessary to maintain and improve transfusion safety.

Keywords: Hepatitis C virus, Blood donors, Seroprevalence, ELISA, Transfusion-transmitted infections

Introduction

Hepatitis C virus (HCV) infection is a leading cause of chronic liver disease, cirrhosis, and hepatocellular carcinoma worldwide. According to global estimates, millions of individuals are chronically infected with HCV, many of whom remain asymptomatic for years. Blood transfusion has historically been an important route of transmission of HCV, particularly before the introduction of routine donor screening

In India, mandatory screening of blood donors for HCV has significantly reduced transfusion-

transmitted infections. However, regional variations in prevalence persist due to differences in donor demographics, awareness levels, and healthcare access. Blood donor seroprevalence studies serve as a valuable epidemiological tool to assess the burden of infection in the community and to evaluate the effectiveness of blood safety measures

The present study was undertaken to determine the prevalence of HCV infection among blood donors at a tertiary care centre in Rajasthan over a five-year period and to analyse year-wise trends.

Materials and Methods

Study design and setting: This was a retrospective, record-based study conducted in the blood bank of Pacific Institute of Medical Sciences, Udaipur, Rajasthan.

Study period

Study period: January 2021 to December 2025.

Study population: All voluntary and replacement blood donors who donated blood during the study period were included.

Inclusion criteria: Blood donors fulfilling standard donor selection criteria as per national blood transfusion guidelines.

Exclusion criteria: Donors who were deferred during pre-donation screening or whose records were incomplete were excluded.

Screening procedure: All donated blood units were screened for anti-Hepatitis C virus (anti-HCV) antibodies using a third-generation enzyme-linked immunosorbent assay (ELISA). Screening was performed with the Erba LISA® HCV Gen3 (v2) kit (Transasia Bio-Medicals Ltd., Daman, India) according to the manufacturer's instructions. The assay is a solid-phase indirect ELISA employing recombinant and synthetic HCV antigens derived from the core, NS3, NS4, and NS5 regions of the viral genome. Serum samples were incubated in antigen-coated microwells, followed by addition of horseradish peroxidase-conjugated anti-human IgG and substrate development using tetramethylbenzidine. Optical density was measured at 450 nm with a reference wavelength of 620–650 nm. Cut-off values were calculated as per kit guidelines. Samples reactive on repeat testing were considered positive and corresponding blood units were discarded.

Data collection and analysis: Relevant screening information were obtained from the blood bank. Data were analysed year-wise, and seroprevalence was calculated as a percentage.

Ethical considerations: The study was approved by the Institutional Ethics Committee of Pacific Institute of Medical Sciences, Udaipur. As this was a retrospective analysis of existing records, informed consent was waived. Donor confidentiality was strictly maintained.

Results

A total of 11,820 blood donations were screened for anti-HCV antibodies during the five-year study period. Six donors were found to be reactive, giving an overall seroprevalence of 0.05%.

Year-wise analysis showed no HCV-reactive donors in 2021 and 2023. One reactive donor each was detected in 2022 and 2024, while four reactive donors were identified in 2025. A progressive increase in the number of blood donations was observed over the study period.

Table 1: Year-wise distribution of blood donations and HCV seropositivity

Year	Total donors	HCV reactive	Prevalence (%)
2021	1511	0	0
2022	1787	1	0.056
2023	2063	0	0
2024	2752	1	0.036
2025	3707	4	0.108
Total	11820	6	0.05

Discussion

Table 2. Comparison of seroprevalence of hepatitis C virus infection among blood donors in India

Author (year)	Country / region	Study design	Study period	Sample size (n)	HCV prevalence (%)
Makroo et al. (2015)	India (North India)	Retrospective	2005–2013	180,447	0.04
Pahuja et al. (2010)	India (Delhi)	Retrospective	2004–2008	192,348	0.08
Gupta et al. (2006)	India (Armed Forces)	Retrospective	2000–2004	175,000	0.06
Chandra et al. (2009)	India (North India)	Retrospective	2003–2007	27,689	0.09
Present study (2025)	India (Rajasthan)	Retrospective	2021–2025	11,820	0.05

The seroprevalence of HCV infection among blood donors in the present study was found to be 0.05%, which is comparable to findings from several Indian studies reporting prevalence rates ranging from 0.03% to 0.1%. The low prevalence observed reflects effective donor selection, increased awareness among donors, and mandatory screening using sensitive assays such as third-generation ELISA.

The absence of reactive cases in certain years and the slight increase observed in 2025 may be attributed to increased donor recruitment, changes in donor demographics, and improved surveillance rather than a true rise in infection rates. Continuous monitoring of transfusion-transmitted infections is essential to ensure blood safety and to identify emerging trends.

Limitations

This study was limited by its retrospective design and single-centre setting. Additionally, nucleic acid testing for HCV RNA was not performed, which may have detected window-period infections.

Conclusion

The present study demonstrates a low prevalence of HCV infection among blood donors at a tertiary care centre. Strict donor selection, sensitive screening techniques, and continuous surveillance are crucial to prevent transfusion-transmitted HCV infection.

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